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Note.—The application for a Patent has become void.

This print shows the Specification as it became open to public inspection on June 22, 1935, under Section 91 (4) (a) of the Patents and Designs Acts, 1907 to 1932.

PATENT **SPECIFICATION**

454,311



Application Date: Dec. 21, 1934.

No. 36725/34. {No. 36726/34.

(One Complete Specification Left under Section 91 (2) of the Acts)

Specification not Accepted

COMPLETE SPECIFICATION

Improvements in the Manufacture of Cycle, Motor-Cycle or like

We, PAUL RENÉ DE PARMENTIER, of 17, Place Xavier Neujean, Liége, and PAUL HENRI DE WILDE, of 15, Boulevard Militaire, Ghent, both in Belgium, both 5 Subjects of the King of the Belgians, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following 10 statement:-

This invention comprises an improved process for the manufacture of cycle, motor cycle and like frames, and means for the carrying out of the process. In 15 this process, the tubes and stays forming a cycle or like frame are placed in a fixture which includes a number of dies. By die-casting, the bracket or lugs are cast direct on to the ends of said tubes or stays,

20 thus ensuring their assembly, suitable metal or alloy being used. Hitherto, in the assembly of the tubes forming a cycle or motor cycle frame or the like, there have normally been used 25 connecting members such as bottom brackets, seat lugs, fork crowns, and top and bottom head lugs, made of malleable iron or sheet metal.

In the manufacturing process forming 30 the subject of the present invention, there are utilized known materials which had not been considered up to the present, with this aim in view, particularly diecast brackets, lugs and the like, made of 35 bronze, brass or aluminium alloys. Thus, these connecting members, produced in a practically finished state, would save labour, would have a better appearance and, in the case of light alloys, would be 40 considerably lighter than the usual malleable iron parts.

The said connecting members made of bronze or brass, could be brazed to the [Price 1/-]

frame tubes, or these tubes could be placed in a fixture or jig, forming a casting die 45 for the pressure or ordinary die-casting of the selected material, in a practically finished form, directly upon the tube ends, thus ensuring their assembly.

Pressure die-casting would be prefer- 50 ably resorted to, but for certain conditions of production, or when otherwise justified by the choice of alloy, ordinary die-casting gives complete satisfaction and its application would be more general 55 for current production and easily flowing metals, and when the initial cost of pressure die-casting equipment is deemed prohibitive.

Thus for instance, the bottom tube, the 60 seat pillar and if desired the rear forks or chain stays, could be placed and maintained in a jig forming a die for the bottom bracket. In this die could be cast the selected metal. ensuring the proper 65 assembly of the tubes.

A similar fixture could be devised for the simultaneous or non-simultaneous diecasting of the seat pillar lugs. Top and bottom steering head lugs could be 70 formed in the same way. However, these are customarily made of sheet steel which could eventually be brazed to the tubes or electrically welded thereto. Die-casting would enable fancy designs to be used.

The allows specially considered are different alloys of aluminium, brass, bronze, zinc or magnesium (for example those known under the registered Trade Marks alpax, duralumin and monel metal, or aluminium bronze and the like). This process could be resorted to when aluminium-alloy tubes are used.

This invention is further exemplified in the following description of the manufac- 85 ture of a cycle frame, with reference to

Price 4s @

the accompanying drawings, in which:—
Fig. 1 represents a set of frame tubes disposed in a jig for the simultaneous diecasting of the bottom bracket and seat

pillar lug.
Figs. 2, 2, 2, 2, 2, 2, 2, and 2, represent in section different forms of the front fork

Fig. 3 represents schematically a verti-10 cal type of machine which can be used in

the process.

Figs. 4 and 4' represent schematically horizontal types of machines showing the principles which could be applied in the 15 manufacture of cycle frames and the like, following this process.

Fig. 5 represents schematically a cross view-of an element of machine in which one half of the die is associated with the 20 plunger type of metal-forcing injector.

Fig. 6 represents a cross sectional view of a bottom bracket obtained by die-casting of the selected metal directly upon the

Figs. 7, 7', 7'i and 7'ii represent different kinds of anchorages with which the tube ends can be provided in the region covered with metal in the die-cast-

ing process.
Fig. 8 represents another kind of

anchorage of built-up type.

Referring to these figures, and particu-Larly to Fig. 1, 1 indicates the bottom tube, 2 indicates the seat pillar, 3 and 4 35 indicate the chain stays and rear forks, and 5 indicates the top tube. These tubes are shown in Fig. 1 held in the dies 15 and butted down against stops 16, where on they are fixed. In this way, the parts 40 of the die, such as 15, reassembled, will form the mould for the die-casting of bottom bracket 10 and seat lug II.

The dies shown in Fig. 1 are combined for the simultaneous casting of bottom 45 bracket 10 and seat pillar lug 11, but these operations could be performed separately.

Bottom tube 1 and top frame tube 5 (in case of a gentlemen's cycle) are generally 50 assembled to the steering head tube 6 by means of pressed sheet steel lugs brazed or electrically welded. It is obvious that the complete frame assembly, including that of the front tube 6, could be per-55 formed in the same casting operation.

For the front fork assembly, a similar process is resorted to. Combined jigs and dies are used for the casting of the crown the reinforced threaded steel tube 7 (see 60 Fig. 2) is inserted in the die and is embedded in the molten metal. The front fork stays or blades are assembled in a further operation to the fork crown ends by brazing as customary.

In a slightly different way, according

to Fig. 21 and 211, the reinforced threaded tube 7 and the stays 9, are all inserted in the die, and the fork crown 8 is produced

by casting.
Fig. 2''1 and 2'''11 represent other types 70

of fork crowns.

Fig. 2111 shows a crown 8 with fork blades 9 embedded in the metal. These blades are fitted with a stop plate 12 which can be welded in order to prevent 75 any molten metal flowing inside the

blades, during the casting operation.
Fig. 2¹¹¹¹ shows another type of fitting similar in aim to Fig. 2¹¹², where a stop member 13 of flanged-conical shape is

provided.

Thus this manufacturing process involves the use of a jig or fixture which receives the tubes or stays, the ends of said tubes or stays being inserted in dies 85 which are parts of the fixture, and these dies forming moulds for the casting of the connecting members: The die-casting operation may produce a partial or a 90 complete frame assembly.

Different types of machines could be

evolved.

Fig. 3 shows schematically a vertical type of machine, in general built along the lines of an hydraulic press; under the 95 working table 14, which carries the jigs and dies, is disposed any numbers of metal-forcing injectors 17, of known general type, communicating with said 100 >

The machine schematically shown in Fig. 4 is in general built like a moulding press, as used in foundries. Under the fixed table 14, supporting the jigs and part of the dies 15, are placed the metal. 105 forcing injectors communicating with

said dies 15.

Fig. 4' shows a section of an injector associated with the under half of a die 15. In this machine, piston 18 comes into a 110 recess 19 in die 15, so that the automatic or non-automatic opening of the die allows the easy withdrawal of the cast piece with the metal which has cooled in the gate or communicating chamber. For its intro- 115 duction, the molten metal is poured into an opening 20. Several combined dies, like this one, controlled by a common system of valves, and disposed for instance as in Fig. 4, could form a machine 120 allowing for the easy change-over from one type of cycle frame to another.

Fig. 5 represents a pressure die-casting unit, composed of a body or framework 21, carrying a vertical cylinder 22 with 125 a piston 23, and a horizontal cylinder with In the base of this unit a piston 25. there is fitted the under-half of a die 15. Piston 23 carries the upper half 15' of the die, properly guided. Piston 23 effects 130

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the closing of the die and maintains the pressure during the casting operation. Through opening 20 there is poured a given quantity of molten metal, in front 5 of the injecting piston 18 operated by the hydraulic piston 25.

A system of valves could insure the proper automaticity of the different movements. For instance, closing of the 10 die, rearward movement of the piston 18, stopping of the piston to allow for the pouring of metal, then injection of metal into the die, opening of the die, and extraction of the cast lug.

A number of units as per Fig. 5, renders possible a combined machine, easily adjustable, with a common table supporting the frame tube holding figs.

ing the frame tube holding jigs.

Replacement of half dies 15 and 15¹
20 would permit different types of frames to be assembled, at minimum cost. As an example, one unit would be assigned to the bottom bracket die-casting, another to the seat-lug, still another to top and 25 bottom head lugs.

Fig. 6 shows as an example a bottom bracket obtained by direct die-casting on the bottom tube 1, seat pillar 2 and rear stays 3. It will be noted that these tubes 30 carry at their ends a sheet-iron cover 26, closing the tube in order to block the tube, to simplify the die and to facilitate and accelerate the demoulding operation.

This invention also, eventually, pro35 vides the tube ends in contact with the metal with anchorage fittings, the purpose of which is to reinforce the final assembly. Such anchorages are shown in Fig. 7 at 27, in Fig. 7' at 28, in Fig. 7'' at 29 and in Fig. 7''' at 30; they can be formed by mandrels, in a press, in a die or in a punching machine, or again they can be built up with special pieces 31, electrically welded for instance, upon the tube,

45 as shown in Fig. 8.

The frame tubes such as 1, 2, 3, 4 and 5, could be made of one of the lighter alloys, such as duralumin, or any other

metal.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

55 (1) Process for the manufacture of cycle, motorcycle or like frames, characterized by the use for all or any of the assembling members, such as bottom bracket, seat lug, top and bottom head 60 lugs and fork crown, of metals or alloys other than malleable iron, such as aluminium, zinc, magnesium or bronze alloys, die-cast directly on to the ends of tubes and or stays forming the frame or the 65 fork, the die-casting being accomplished

under pressure or not.

(2) Process for the manufacture of cycle, motorcycle or like frames, according to claim 1, characterized by the use of tubes made of light alloys, the assembly of said tubes being obtained by the diecasting of connecting lugs and brackets with a suitable alloy, this die-casting being accomplished under pressure or not.

(3) Process for the manufacture of cycle, motor-cycle or like frames according to claims 1 and 2, characterized by the fact that the tubes and/or stays to be assembled are previously prepared and fixed in a suitable jig or fixture, said fixture including the appropriate dies or moulds, the assembling members such as the bottom bracket and/or lugs being diecast directly in these moulds, on to the said tube or stay ends, this die-casting being accomplished under pressure or not.

(4) Process for the manufacture of cycle, motorcycle or like frames, according to claims 1, 2 and 3, by die-casting of the assembling members, such as bottom bracket and lugs, directly on to the tubes or stays forming said frame, characterized by the fact that said tubes or stays are blocked, for instance by means of a small pressed steel cover, the purpose of said cover being to prevent any molten metal from flowing into the tubes or stays, in order to simplify the lay-out of the die, reduce the tool cost and accelerate production.

(5) Process for the manufacture of cycle, motorcycle or like frames, according to claims 1, 2, 3 and 4, by die-casting of the assembling members, such as bottom bracket and lugs directly on to the 105 tube ends of said frame, characterized by the fact that these tube ends are provided with anchorage fittings, in order to strengthen and reinforce the assembly.

(6) Means for carrying out the process 110 according to claims 1, 2 and 5, comprising vertical or horizontal types of machines, similar to a press or to a moulding machine, characterized by a fixed table carrying the jigs or fixtures and the 115 underpart of the dies, suitable metalinjecting mechanisms communicating with

said dies.

(7) Means for carrying out the process according to claim 4, consisting of a metal 120 injecting mechanism associated with part of a casting-die, the injecting piston at the end of its movement coming out into a recess in the die, the aim of said recess being to allow the easy extraction 125 of the cast lug with the cooled mass of metal attached, when the die is opened, automatically or not.

(8) Means for carrying out the process according to claims 4 and 5, consisting of 180

a machine composed of an injecting piston, a pressure piston and a die, the die being opened or closed by the manœuvre of a system of valves, which ensures full 5 or partial automaticity in the sequence of operations.

(9) Process for the manufacture of cycle, motorcycle or like frames according to claims 1 to 5, substantially as lu described.

(10) Means for carrying out the process

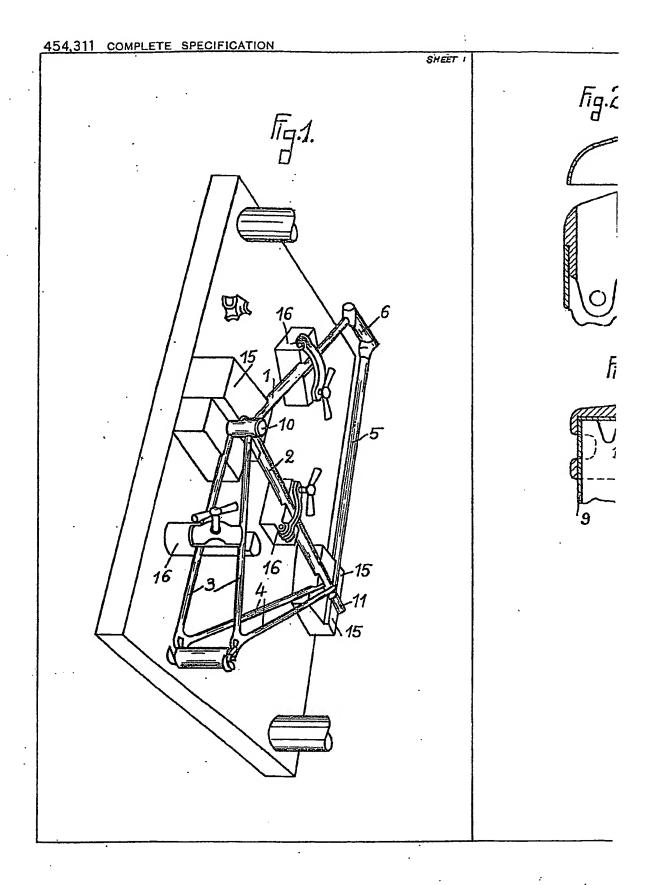
of claims 1, 2, 3, 4, 5 or 9, comprising machines, fixtures or assembling units, according to claims 6, 7 or 8, substantially as described with reference to the 15 accompanying drawings.

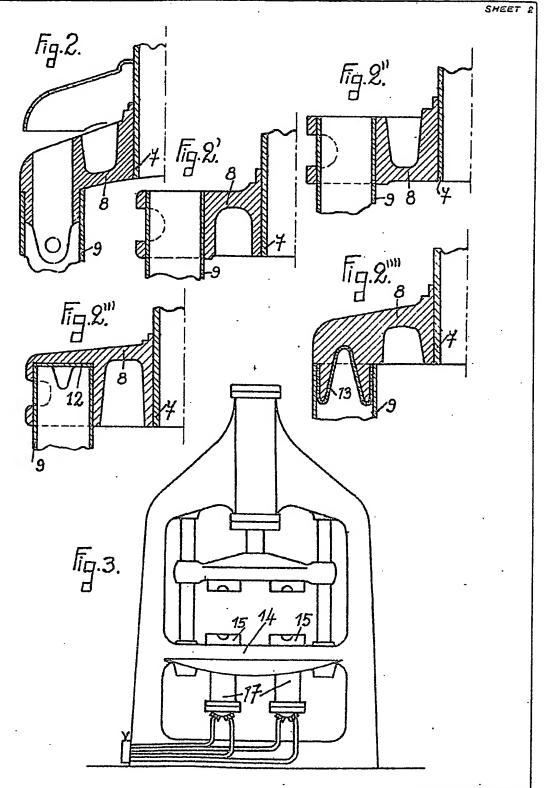
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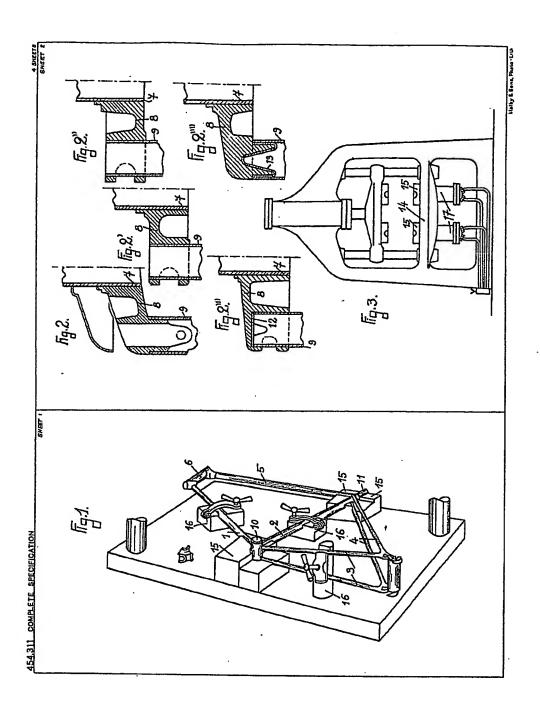
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